FREIGHT TRACKING AND CONTROL SYSTEM

Cross-Reference to Related Applications

The present application claims the benefit of U.S. Provisional Application 60/439,130, filed January 10, 2003.

Background of the Invention

This invention is directed to a system and method for tracking and controlling goods as they move through the supply chain. More particularly, this invention is a supply chain event management system which generally includes four basic example components: (i) a handheld scanner application, (ii) a desktop application that transmits that data to a centralized server, (iii) a web service that parses the data and inserts it into a SQL database, and (iv) a web based reporting tool.

Supply chain management is a common problem for any organization that must transport goods over a wide geographic area. Successful businesses cannot afford to routinely lose goods or otherwise mismanage their supply chain. Unfortunately, until recently, many companies were forced to track goods by manually counting them as they left one point in the supply chain and were received at another. After counting the goods shipped and received, manually generated paper reports were prepared and mailed or faxed to management to identify shipment exceptions.

With the advent of computers, systems were created that partially automated the data collection and reporting process. Bar code scanners collected data at the consolidated shipment level, value added networks (VAN's) or file transfer protocol (FTP) processes were used to transmit electronic files between transportation companies and their shipping clients, company firewalls were modified to receive these electronic files, and, once this data was received, reports were created that could be distributed to decision makers.

While much better than paper and pencil, these systems were ultimately not accurate, efficient, or cost-effective. First, by tracking freight at only the shipment level, cartons and other individual freight items were invisible and could be lost in the supply chain. Second, transmitting electronic files using VAN's or an FTP process required

companies to open their firewalls adding time, cost and increasing the possibility of security breaches. Finally, even when data made it through the company firewall, there was no secure method for a shipper and its transportation provider to view data using the same database or reports.

There is a need for a system which uses bar code scanning to track freight at the carton or item level at multiple points in the supply chain, a web service to directly insert data into a centralized data base, and internet based reports which can be accessed by multiple users via common web browsing tools.

Summary of the Invention

In accordance with the present invention, there is provided a system and method for tracking and controlling the movement of goods and freight through the supply chain.

According to one aspect, the present invention provides an electronic system for managing items in a supply chain. The system generally includes item information capturing means adapted for capturing identification information associated with an item identified for supply chain management; mode specifying means adapted for receiving user input representative of a selection of at least one of a plurality of capturing modes, wherein each capturing mode is adapted for creating associated information by associating the captured item information with supply chain information; and transferring means adapted for transferring the associated information to an electronic storage device.

According to another aspect, the present invention provides a method for managing items in a supply chain. The method generally includes the steps of capturing identification information associated with an item identified for supply chain management; receiving user input representative of a selection of at least one of a plurality of capturing modes, wherein each capturing mode is adapted for creating associated information by associating the captured item information with supply chain information; and transferring the associated information to an electronic storage device.

These and other advantages, aspects, and features will be understood by one of ordinary skill in the art upon reading and understanding the specification.

Brief Description of the Drawings

Figure 1 is a diagram illustrating an overview of the entire freight tracking and controlling system according to the present invention;

Figure 2 is a diagram illustrating the Distribution Center Direct shipping model according to the present invention;

Figure 3 is a diagram illustrating the Pool Distribution shipping model according to the present invention;

Figure 4 is a diagram illustrating the Distribution Center Direct Consolidation Mode of the freight tracking and controlling system according to the present invention;

Figure 5 is a diagram illustrating the Distribution Center Direct Grid Mode according to the present invention;

Figure 6 is a diagram illustrating the Distribution Center Direct Truck Mode according to the present invention;

Figure 7 is a diagram illustrating the Distribution Center Direct Delivery Mode according to the present invention;

Figure 8 is a diagram illustrating the Welcome Screen for the Distribution Center Direct Scanning Application according to the present invention;

Figure 9 is a diagram illustrating the Preferences Screen for the Distribution Center Direct Scanning Application according to the present invention;

Figure 10 is a diagram illustrating the Scan Consolidation Items Screen of the scanner application according to the present invention;

Figure 11 is a diagram illustrating a data filled Scan Consolidation Items Screen of the scanner application according to the present invention;

Figure 12 is a diagram illustrating the Scan Grid Items Screen of the scanner application according to the present invention;

Figure 13 is a diagram illustrating a data filled Scan Grid Items Screen of the scanner application according to the present invention;

Figure 14 is a diagram illustrating the Scan Truck Items Screen of the scanner application according to the present invention;

Figure 15 is a diagram illustrating a data filled Scan Truck Items Screen of the scanner application according to the present invention;

Figure 16 is a diagram illustrating the Truck Inspection Screen from the Scan Truck Items mode of the scanner application according to the present invention.

Figure 17 is a diagram illustrating the New Delivery Screen of the scanner application according to the present invention;

Figure 18 is a diagram illustrating the Scan Delivery Items screen of the scanner application according to the present invention;

Figure 19 is a diagram illustrating a data filled Scan Delivery Items screen of the scanner application according to the present invention;

Figure 20 is a diagram showing the inbound scan process in the Pool Distribution model according to the present invention;

Figure 21 is a diagram showing the outbound scan/integrity check scan process in the Pool Distribution model according to the present invention;

Figure 22 is a diagram showing the delivery scan process in the Pool Distribution model according to the present invention;

Figure 23 is a Welcome Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 24 is a Preferences Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 25 is an Inbound Trip Information Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 26 is a Scan Cartons Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 27 is a Carton Types Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 28 is a Damages Type Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 29 is a Manual Entry Screen of the Pool Distribution inbound/outbound scanning application according to the present invention;

Figure 30 is a BearWare Data Transfer Module Screen of the freight tracking and controlling system according to the present invention;

Figure 31 is an Outbound Scan Screen of the freight tracking and controlling

system according to the present invention;

Figure 32 is an Outbound Scan Screen of the freight tracking and controlling system according to the present invention;

Figure 33 is a Welcome Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 34 is a Preferences Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 35 is a New Delivery Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 36 is a Scan Cartons Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 37 is a Delivery Reports Query Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 38 is a Delivery Reports Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 39 is a General Tab of the Carton Details Screen of the Delivery Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 40 is a Transfer Tab of the Carton Details Screen of the Delivery Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 41 is a Manual Entry Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 42 is a Numeric Keypad for the manual entry of carton numbers in the Pool Distribution Delivery Scan Application according to the present invention;

Figure 43 is a duplicate scan error message screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 44 is a misroute scan error message screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 45 is a Shipment Details Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 46 is a Store Representative Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 47 is a View Deliveries Screen of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 48 is a General Tab of the Delivery Details Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 49 is a Store Information Tab of the Delivery Details Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 50 is a Dates Tab of the Delivery Details Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 51 is a Events Tab of the Delivery Details Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 52 is a Cartons Tab of the Delivery Details Report of the Pool Distribution Delivery Scan Application according to the present invention;

Figure 53 is a diagram illustrating how data is transferred from the desktop client application to the web-based SQL database;

Figure 54 is a login screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 55 is a Welcome screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 56 is a scan summary report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 57 is a scan summary report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 58 is a bar code tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 59 is a pallet tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 60 is a WMS Box tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 61 is a Pro Number Report Query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 62 is a Pro Number Summary report screen of the web based Distribution

Center Direct reporting application according to the present invention.

Figure 63 is a Stem Time report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 64 is a Stem Time report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 65 is a Delivery Exception report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 66 is a Delivery Exception report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 67 is a Barcode tracking report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 68 is a Barcode tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 69 is a WMS Box tracking report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 70 is a WMS Box tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 71 is a Pallet tracking report query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 72 is a Pallet tracking report screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 73 is a Bill of Lading query screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 74 is the Bill of Lading listing screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 75 is a Bill of Lading screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 76 is a Site Management screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 77 is a User Management screen of the web based Distribution Center Direct reporting application according to the present invention.

Figure 78 is a Login screen of the web based Pool Distribution reporting application according to the present invention.

Figure 79 is a My WebTMS screen of the web based Pool Distribution reporting application according to the present invention.

Figure 80 is a ASN/Trip List query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 81 is a ASN/Trip List report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 82 is a Trip Status report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 83 is a Trip Status report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 84 is a Trip Summary report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 85 is a Trip Summary report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 86 is a Delivery Summary report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 87 is a Trip Exceptions report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 88 is a Trip Exceptions report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 89 is a Delivery Exceptions report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 90 is a Delivery Exceptions report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 91 is a Scan Summary report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 92 is a Scan Summary report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 93 is a Store/Trip List report query screen of the web based Pool

Distribution reporting application according to the present invention.

Figure 94 is a Store/Trip List report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 95 is a Carton Tracking report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 96 is a Carton Tracking report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 97 is a Administration Menu of the web based Pool Distribution reporting application according to the present invention.

Figure 98 is a Import Summary report query screen of the web based Pool Distribution reporting application according to the present invention.

Figure 99 is a top portion of the Import summary report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 100 is a bottom portion of the Import summary report screen of the web based Pool Distribution reporting application according to the present invention.

Figure 101 is a About Menu screen of the web based Pool Distribution reporting application according to the present invention.

Detailed Description of a Preferred Embodiment

Overview

The present invention is directed to a supply chain event management system for tracking and controlling goods and freight using bar code scanners to collect data 102, a desktop application to initially receive and transmit that data 104, a web service to receive that data and insert it into a SQL database 106, and a web-based reporting application 108. A diagram giving an overview of the freight tracking and controlling system 100 is shown in Figure 1.

The present invention can be used in at least two points in the supply chain: (i) distribution center direct shipments and (ii) pool distribution shipments. In the distribution center direct model, goods are warehoused at a distribution center, customer orders are picked from inventory, and then delivered. A diagram illustrating the

distribution center direct model is shown in Figure 2. In the pool distribution model, goods are also warehoused at a distribution center; however, they are not delivered to the customer directly from the distribution center. Goods for multiple delivery points in a single geographic area are loaded on a tractor trailer at a shipper's distribution center, shipped to a secondary, usually independent, warehouse ("pool distribution point") where the goods are unloaded, sorted and segregated into single store orders. These orders are then shipped from the pool distributor to their ultimate delivery point. A diagram illustrating the distribution center direct model is shown in Figure 3.

In both the distribution center direct and pool distribution models, the starting point in the supply chain is a customer order 110. These orders are processed by a warehouse management system ("WMS") 112. The WMS generates instructions to warehouse personnel on which inventory at the distribution center should be processed for outbound shipment during a particular shipping cycle. This is generically referred to as an advance shipment notice ("ASN") 114. The ASN is electronically transmitted to the web database 118 via an FTP transmission 116.

In the distribution center direct model, the WMS generates an ASN 202 which consists of a customer order or aggregation of customer orders. Freight is scanned at the time it is picked out of the warehouse inventory. If the goods to be picked are small, they are scanned as they are consolidated into larger containers (macros or pallets, etc.) bound for the same delivery site 204. Larger items and macros and pallets are scanned directly into a shipping grid 208. The items in the shipping grids are then scanned onto the delivery truck 210and again when they are delivered 212. Goods from a vendor bound to the distribution ("vendor pickup") are also scanned at pickup and delivery to the distribution center 214. A desktop application 104 is then used to upload and process the scan data 102, and send the scan data to the web service 106 which inserts it into the web database 118. Finally, a Web Reporting application 108 provides online data reporting and allows users 120 to make inquiries about the freight data stored in the web database 108.

In the pool distribution model, the WMS generates the ASN 302 after goods have been prepared for outbound shipment and loaded onto a truck bound for a pool distribution point. The ASN represents a listing of goods that should have been shipped

to the pool distribution point. The ASN is transmitted to the web database via an FTP transmission. Upon receipt of the goods at the pool distribution point, the freight is scanned ("inbound scan") 304, sorted into individual store orders, and scanned again ("outbound scan") 306 to verify the integrity of the sortation, loaded onto trucks for store delivery and scanned at the store ("delivery scan") 308. If freight is being picked up at the store for return to the shipper's distribution center or transferred to another store, the freight is scanned as it leaves the store ("returns or transfer scan") 310. After the freight is scanned at each scan point, the desktop application is used to upload, process the scan data and then transmit it to the web database. A web reporting application is then used to provide online data reporting allowing users to make inquiries about the freight data stored in the web database.

Data Collection in the Distribution Center Direct Model

Scan Points

In the distribution center direct model, Windows Pocket PC-based handheld scanners are used to collect data at the following points in the supply chain: (i) consolidation, (ii) grid, (iii) truck loading, (iv) delivery, and (v) vendor pickup.

Consolidation mode scanning 400, as shown in Figure 4, is used to track smaller items as they are placed into larger shipping units such as a pallet, carton, tote or macro container. In the consolidation scanning mode, the user selects the Consolidation mode on the scanner 402, scans or manually enters a macro or pallet barcode 404, scans individual items into the macro or pallet 403, and uploads the scan data to the Desktop application 408.

Grid mode scanning 500, as shown in Figure 5, is used when staging freight in outbound shipping grids. These grids are used to aggregate items such as pallets, macros, and large unconsolidated items bound for a single delivery site. A user first selects Grid Mode Scanning 502, scans a barcode placed in a conspicuous area within each grid 504, and then scans items from the consolidation mode (described above) or large non-consolidated items into the grid 506. When finished scanning items into the grid, the user uploads the scan data to the desktop application 508.

Truck mode scanning 600, as shown in Figure 6, is used to scan items placed into a shipping grid onto a delivery truck. The truck mode can also be used to scan PRO number barcode labels when making a pickup at a vendor site. A user first selects the Truck mode scanning 602 and enters mode information 604. This scanning mode then allows drivers to scan items from the Grid mode (described above) onto the truck 606. When the user is finished scanning 608, the user is prompted to enter vehicle inspection information 610. Finally, the scan data is uploaded from the scan gun 612 to the desktop application 104.

The Delivery mode scanning 700, as shown in Figure 7, is used by the delivery driver when unloading freight from the truck at a delivery site. It is also used by a driver when unloading vendor pickup items at the distribution center. A user first selects the Delivery mode 702 then enters the mode information 704. This scanning mode then allows drivers to scan the items from the Truck mode (described above) into the delivery point 706. Once a user is finished scanning 708, the scanned data is then uploaded from the scan gun 710.

Using the Distribution Center Direct Scan Application

After selecting the scanner application from the application menu on the Windows Pocket PC scanner, the user is brought to the Welcome Screen 800, as shown in Figure 8. The Welcome Screen 800 displays the date 802 and time 804. A user can then choose which scan mode 102 to use, such as Consolidation 806, Grid 808, Truck 810, or Delivery 812. User Preferences 814 can also be set in the scanner.

By clicking on the Preferences button 814, the Preference Screen 900 is displayed, as shown in Figure 9. The preferences screen 900 contains fields for user, route, originating location (i.e. "Plant"), and scanner ID. A user can enter a user ID 902, a route number 904, and a Plant number 906. The scanner ID number is displayed also 908. Once entered, this information can either be saved 910 or cancelled 912. If the cancel button 912 is clicked, the changes are discarded and the user is returned to the Welcome screen 800. If the Save Button 910 is tapped, the preferences set are recorded and the user is brought back to the Welcome Screen 800.

As discussed above and as shown in Figure 2, the system allows users to scan

items at five different scan point/modes, such as Consolidation Mode Scanning 204, Grid Mode Scanning 208, Load Truck Mode Scanning 210, Delivery Mode Scanning 212, and Vendor Pick-up Mode Scanning 214.

Once the user selects the Consolidation mode on the scanner 806, the user is brought to the Scan Consolidation Items screen as shown in Figure 10. The fields are carton class 1002, and macro/pallet number 1004. The screen also has a counter which maintains the number of items scanned into a macro or pallet 1006 and a timer indicating the elapsed time spent scanning items into a macro/pallet 1008. Figure 11 shows these fields filled in after an item has been scanned in consolidation mode. The barcode number for the item scanned into the macro or pallet is displayed at the top of the screen 1102. The item classification indicates the type of item placed into the macro or pallet 1104. The macro/pallet number is displayed 1106. The number of items scanned into the macro/pallet is displayed 1108 as is the elapsed time of the scanning session 1110.

Additionally, the scanner application contains forward 1112, backward 1114, first 1116, and last 1118 arrow buttons that will navigate the user through the scanned items. If the Cancel button 1120 is clicked, the information is reset on this screen. If the Delete button 1122 is clicked, the current scanned item will be deleted. If the Manual button 1124 is clicked, the user navigates to the Manual entry screen. If the Finish button 1126 is clicked, the scanning operation is complete and the user is returned to the Welcome screen 800.

Once a user selects the Grid mode 808 on the Welcome Screen 800 of the scan application, the user is taken to the Scan Grid Items screen as shown in Figure 12. The Scan Grid Items screen 1200 contains fields for item classification 1202, the grid number 1204, and displays the number of items scanned into a grid in a specific scanning session 1206 and the elapsed time for the scanning session 1208. Figure 13 depicts this same screen with the data fields filled in. After scanning the grid label and an item into the grid, the barcode number of the scanned item is displayed at the top of the screen 1302, the item classification is filled out 1304, the grid number is displayed 1306, the number of items scanned 1308 and the elapsed time 1310 are shown.

Additionally, the grid scan mode contains forward 1312, backward 1314, first 1316, and last 1318 arrow buttons that will navigate the user through the scanned items.

If the Cancel button 1320 is clicked, the information is reset on this screen. If the Delete button 1322 is clicked, the current scanned item will be deleted. If the Manual button 1324 is clicked, the user navigates to the Manual entry screen. If the Finish button 1326 is clicked, the scanning operation is complete and the user is returned to the Welcome screen 800.

Once the user selects the Truck mode 810 on the Welcome Screen 800, they are taken to the Scan Truck Items screen as shown in Figure 14. The Scan Truck Items screen 1400 contains fields for item classification 1402, the delivery site 1404, the number of items scanned 1406 and the elapsed time for the scanning session 1408 After the delivery site field is entered 1404, the user proceeds to scanning freight onto the truck.

Figure 15 shows the Scan Truck Items screen with data. The barcode number of the scanned item is displayed at the top of the screen 1502, the item classification is filled out 1504, the delivery site number is displayed 1506, the number of items scanned 1508 and the elapsed time 1510 are shown. Additionally, the interface contains forward 1512, backward 1514, first 1516, and last 1518 arrow buttons that will navigate the user through the scanned items. If the Cancel button 1520 is clicked, the information is reset on this screen. If the Delete button 1522 is clicked, the current scanned item will be deleted. If the Manual button 1524 is clicked, the user navigates to the Manual entry screen. If the Next button 1526 is clicked, the user is brought to the Inspection screen as shown in Figure 16. The inspection screen requires the user to insert the tractor number 1602, the trailer number 1604 and the mileage 1606. Once these fields are filled in the user selects the Finish button 1608 and is returned to the Welcome screen 800. The Back button, if selected, takes the user back to the Scan Truck Items Screen 1500.

Once the user selects the Delivery mode 812 from the Welcome Screen 800, the user is brought to the New Delivery screen 1700 to enter the delivery site code 1702 shown in Figure 17. This code is entered by scanning a barcode label at the delivery site which then fills the Delivery Site field or the driver can tap the Set button 1703 and type in the delivery site code. After setting the delivery site, the user taps the Next button 1706 (or taps the Back button 1704 to return to the Welcome Screen). Tapping the Next button 1706 takes the user to the Scan Delivery Items screen 1800 as shown in Figure 18.

Here the user begins scanning the barcodes of the items to be delivered. After scanning each item, the user selects the item class 1802 and whether the item is damaged 1804. The Delivered Counter 1806 keeps track of the total number of items scanned and the Damaged Counter 1808 the total number of scanned items to which the user has assigned a damage designation. An elapsed time clock 1810 runs keeping track of the time from the entry into the Scan Delivery Items screen. If an item to be delivered does not have a barcode label on it, the user can tap the No Label button 1812 which assigns a carton number to the item. The user can tap the Cancel button to escape from the Delivery Scan mode. If the user taps the Delete button, the user removes the last scanned item from the scanner's memory. The Manual button 1814 is used if the barcode label is unreadable by the scanner. Tapping this button brings the user to a numerical keyboard to tap in the barcode number. Figure 19 shows the Scan Delivery Items Screen with data entered. The barcode number is displayed 1902, the item class 1904, the damage designation 1906, the delivered counter 1908, damage counter 1910, and elapsed time 1912. When the delivery is completed, the user taps the Finish button 1914 and is brought back to the Welcome Screen 800.

Users can also scan items that are picked up at vendor sites and brought back to the Distribution Center. At a vendor pickup site, the user selects the Truck Mode 810 from the Welcome Screen 800. The user then enters the class 1402 and delivery site 1404, which in the case of vendor pickup is a distribution center code, and then scans the vendor pick up/PRO# label. Upon arrival at the distribution center, the driver selects delivery mode 812 from the Welcome Screen 800, enters the distribution center code 1702 and scans the freight.

Data Collection in the Pool Distribution Model

Scan Points

In the pool distribution model, handheld scanners are used to collect data at various points in the supply chain including (i) inbound, (ii) outbound scan/integrity check, (iii) delivery, and (iv) pickup.

The inbound scanning process is shown in Figure 20. Inbound scanning occurs upon the arrival of a truck from a shipper's distribution center at a pool distribution site.

Here the pool distributor selects inbound scanning mode on the scanner 2002, enters information on the inbound load such as the trailer number, seal number, etc. 2004, scans the freight off of the tractor trailer 2006, and, when finished scanning all of the cartons on the trailer, uploads the data captured by the scanner to the desktop application 2008.

The outbound scan/integrity check process is shown in Figure 21. Outbound scanning/integrity check scanning occurs after the initial receipt of the shipper's freight and the inbound scan. Once the freight that has been received is sorted and segregated by store order, the outbound scan/integrity check mode 2102 is selected, the store number of the order to be checked is entered into the scanner 2104, and the cartons scanned 2106. If in the process of scanning, a carton has been mis-sorted, the scanner will emit an audible tone and the scanner will turn off. This alerts the user to an incorrect sortation. This scan also helps the pool distributor to catch any cartons that were not scanned inbound. After completing this scan, the data in the scanner is uploaded into the desktop application 2108.

Figure 22 shows the delivery scanning process. Delivery scanning is performed by the driver at the store when making a delivery. Delivery scanning can be performed in either batch or preload mode. In batch mode, the scanner simply collects the data from each barcode scanned. In preload mode, the barcode numbers of cartons expected to be delivered to a particular store are loaded into the scanner 2202. When scanning a carton barcode at delivery, the scanner application compares the barcode scanned against the list of barcode carton numbers preloaded into the scanner for that store. If the barcode scanned matches the barcode preloaded, the scanner records a match. If the barcode scanned is not included in the preloaded list of cartons, the scanner records an overage. If at the end of scanning, all of the preloaded cartons are not scanned, the preloaded scanner application reports those cartons as shortages.

Whether the driver delivery scans in batch or preloaded mode, the scanning process is the same. After arriving at the store, the driver selects delivery mode on the scanner 2204, and either scans a store barcode or manually enters the store number 2206 which records the time of arrival for on-time delivery performance reporting, and then begins to scan the cartons 2208. If the driver needs to return to the truck to gather more cartons for the delivery, the driver checks out by scanning the store barcode and upon

return scans the store barcode again to check in. This provides the pool distributor with a snapshot of the delivery process. At the conclusion of scanning all of the cartons, the driver enters the name of the store receiving personnel which ends the delivery scanning session. Upon return to the pool distributor's terminal, the scanner data is uploaded 2210 into the desktop application.

Using the Pool Distribution Scanner Application

After turning on the scanning device, the user must select the scanning program by tapping the BWICE icon on the screen. The user is then brought to the BearWare Inbound/Outbound Welcome Screen 2300 as shown in Figure 23. This screen displays the name of the program 2302, the version number of the scanning software 2304, buttons for the three scanning modes: inbound 2306, outbound 2308, and integrity check 2310, a preferences button 2312, the date and time 2314, the user name 2316, and the scanner number 2318.

By tapping the Preferences button 2312, the user is brought to the Preferences screen 2400 shown in Figure 24. Preferences are set prior to initiating each scanning session. Here the user's initials 2402 and the scanner identification number 2404 can be entered. Once this information is entered, the user selects the Save button 2406 to record his entries and return to the Welcome Screen 2300. The user can select the Cancel button 2408 to reset the preferences screen.

Inbound scanning of freight is initiated by tapping the Inbound button 2306 on the Welcome Screen 2300. This brings the user to the Inbound Trip Information Screen 2500 as shown in Figure 25. The user enters the shipper's company code 2502, trip number 2504, carrier 2506, trailer number 2508, seal number 2510, and scanner user initials (if not already set in Preferences) 2512. After entering this information the user taps the Next button 2514 to start scanning. If the user wants to return to the Welcome screen 2300, they can tap the Back button 2516.

While scanning freight, the Scan Cartons screen 2600 is displayed as shown in Figure 26. This screen gives the user the ability to select the type of freight being scanned and assign damage codes to it if necessary. If the user taps the Types button 2602 on the Scan Carton screen, they are brought to the Types screen 2700 shown in

Figure 27. At the Types screen 2700, the user can view the type previous selected 2702. The user can select which type of item is being scanned: carton 2704, envelope 2706, sign pack 2708, fixture 2710, non-conveyable 2712, weights 2714, bag 2716, hard tote 2718, tube 2720, or pallet 2722. If the lock check box 2722 is selected, the presently selected item type will be assigned to all subsequently scanned items. By tapping the Back button 2724, the user is brought back to the Scan Cartons screen. If the Damages button 2604 is selected on the Scan Cartons screen 2600, the user is brought to the Damages screen 2800 shown in Figure 28. At the Damages screen, the user can view the damage type previously selected 2802. The user can also select a type of damage: no damage 2804, wet 2806, torn 2808, crushed 2810, retaped 2812, barcode damage 2814, damages obvious 2816, open 2818, bursted overpacked 2820, crushed underpacked 2822. If the Lock box 2824 is selected after a damage type is tapped, that damage type will be assigned to all subsequently scanned items. By tapping the Back button 2826, the user is brought back to the Scan Cartons screen 2600.

If a barcode label is damaged or otherwise unscannable, the user can tap the Manual button 2606 on the Scan Cartons screen 2600 to get to the Manual Entry 2900 screen as shown in Figure 29. Once at the Manual Entry screen 2900, the user selects the Carton Type 2902, Division 2906, Store Number 2908, Carton Number 2910, Damages 2912, and Carton Class 2914. The company is already displayed 2904. After entering all of this information, the user taps the OK button 2916 to record the information and return to the Scan Cartons screen 2600 or taps the Cancel button 2918 to delete any entered information and return to the Scan Cartons screen 2600.

After all of the cartons have been scanned, the user places the scanner in a cradle attached to a PC or connects to the PC using a wireless connection. The BearWare Data Transfer Module screen, Figure 30, is displayed on the PC screen as the data is being transferred to the PC.

When delivering freight to a store or other delivery point, the delivery scan mode is used. After tapping the delivery scan icon on the scanner, the user is brought to the Delivery Scan Welcome screen 3300 as shown in Figure 33. This screen shows the application name 3302 and version number 3304 and has four buttons: New Delivery 3306, View Deliveries 3308, Preferences 3310, and Transfer Data to Payless 3312. The

Welcome Screen also shows the present time and date 3314, the user's initials 3316, the route number 3318, and scanner number 3320.

Tapping the Preferences Button 3310 brings the user to the Preferences screen 3400 shown in Figure 34. Here the user sets his three letter initials in the user box 3402, the three digit route number 3404, and two digit scanner number 3406. Check boxes are provided for enabling store label scanning 3408, scan back check 3410 and saving store numbers 3412. The Enable Store Label scanning box 3408 will be checked when stores to which deliveries are made have barcode labels at their stores which are scanned to initiate a delivery scanning session. The Scan Back Check box 3410 will be selected if the user wants to have the scanner review the last fifty cartons for duplicate scans. The Save Store Number check box 3412 will be selected if the user wants the scanner to save store numbers that have been scanned in a store number pick list. The Clear button 3414 is used to clear all set preferences and start over. Tapping the Cancel button 3418 will bring the user back to the Welcome Screen 3300. After entering the preference data, tapping the Save button 3416 records the preferences and returns the user to the Welcome screen 3300.

Tapping the New Delivery Button 3306 brings the user to the New Delivery Screen 3500 as shown in Figure 35. The user must first select whether this delivery is a Preloaded Delivery or a New (batch) Delivery. Preloaded delivery scanning refers to a process by which store delivery data is entered into the scanner prior to making the deliveries. When scanning in Preloaded Delivery mode, the scanned cartons are checked against the carton list in the scanner. Consequently, a user knows whether all cartons for a particular delivery have been scanned. If cartons are missing from the store order, the user can view a list showing which ones are missing. If no store data is preloaded into the scanner, scanning at delivery is done in "batch" or "data collection" mode. If scanning in preloaded mode, the Preloaded Delivery button 3502 will be highlighted. If scanning in batch or data collection mode, the New Delivery button 3504 will be highlighted.

When making a preloaded delivery, the user scrolls through the store list 3506 to select the store being delivered. By tapping the Next button 3508, the user is brought to the Scan Cartons screen 3600 as shown in Figure 36. The Scan Cartons screen shows the

Mode 3602 (delivery, pickup, etc.), the Delivery Type 3604 (Preloaded, Batch), the Carton Number scanned 3606, whether the carton is damaged 3608, the carton class 3610 and counters showing the total number of cartons expected to be delivered to the selected store 3612, the actual number of cartons scanned 3614 and short 3616, the number of cartons picked up 3618, damaged 3620 or misrouted 3622. A clock runs timing the length of the delivery 3624.

By tapping the Reports button 3626 on the Scan Cartons Screen 3600, the user is brought to the Delivery Reports Screen 3700 as shown in Figure 37. From the pull down list 3702, the user then can select what report to display: all cartons, delivered cartons, match cartons, non-cartons, or short cartons. For example, tapping the short carton menu option in the pull down menu 3702 will return a report screen 3800 as shown in Figure 38. This report displays a list of all cartons that were preloaded, but not scanned at delivery. If the user taps the carton number on the screen 3802, the Carton Details button 3804 becomes active. By tapping on the Carton Details button 3804, the user is brought to the Carton Details Report 3900 shown in Figure 39. Data displayed in the General Tab 3902 of this report are the carton number 3904, the scan date and time 3906, whether the carton was preloaded into the scanner 3908, the preload status 3910, the origin 3912, the company 3914, the company's division 3916, the store number 3918, the damage status 3920, the scan mode 3922, and carton class 3924. Tapping the Transfer Details tab 3926 displays the information relating to the transfer of cartons from one store to another. The data displayed on this screen 4000, Figure 40, is the carton number 4002, the source of the carton 4004, the transferred to store 4006 and transferred to division 4008. When tapping the Close button on the reports screen 3928, 4010, the user is brought back to the Delivery Reports screen 3700. Tapping the Close button 3704 on the delivery reports screen 3700 will bring the user back to the Scan Cartons Screen 3600.

If the driver must return to the truck to get more cartons, the driver can tap the Check Out button 3628 which records the time leaving and re-entering the store and also locks the scanner so that no cartons can be scanned while the driver is checked out.

If a barcode label is unreadable by the scanner, the user can tap the Manual button 3630 which brings them to the Manual Entry screen 4100 shown in Figure 41. Here the user selects the Mode 4102, the Carton Class 4104, the Company 4106, the Division

4108, and Damage type 4114, and enters the Store Number 4110, and the Carton number 4112. By tapping the Set buttons, the user is brought to a numerical keypad as shown in Figure 42 to enter the store number and carton number. By tapping the OK button 4116 or Cancel button 4118, the user is brought back to the Scan Cartons screen 3600.

The user taps the Cancel button 3632 to exit the Delivery Scan screen. The user taps the Delete button 3634 to delete a scan.

If the user scans the same carton more than once, an error message 4300 such as shown in Figure 43 is displayed telling the user that the carton has already been scanned or manually entered. The user must tap the OK button 4302 to clear this error message and begin scanning again. If the user scans a carton barcode which does not match the store number to which the carton is supposed to be delivered, another error message is displayed. This misroute error message 4400 is shown in Figure 44. The user must tap the OK button 4402 to clear this error message and begin scanning again.

When finished scanning all of the cartons to be delivered, the user taps the Finish button 3636. This brings the user to the Accepted By screen 4500 shown in Figure 45. This screen displays shipment details relating to the most recent delivery scanning session: The company 4502, the division 4504, the store number 4506, the number of cartons damaged 4508, expected 4510, misrouted 4512, actually scanned 4514and short 4516, picked up 4518, time elapsed for the delivery 4520, and the return bill of lading number 4522 and transfer bill of lading number 4524, if any. To finish the delivery, the user must enter the store representative's name. This is done by tapping the Set button 4526 which brings the user to the Store Representative screen 4600 shown in Figure 46 where the user taps the appropriate letters to type the store representative's name. When finished, the user taps the OK button 4602 to return to the Accepted By screen 4500. Once the store representative's name is entered, the user can select the Finish button 4528 to complete the delivery scanning session. Tapping the Back button 4530 will take the user back to the Scan Cartons screen 3600.

From the Welcome Screen 3300, the user can also access data on all delivery scans by tapping the View Deliveries 3308 button. This takes the user to the View Deliveries screen 4700 shown in Figure 47. This screen contains a list of all deliveries made and contains columns for the Company 4702, the Division 4704, the Store Number

4706 and the Status 4708. By tapping the Back button 4710, the user is taken to the Welcome Screen 3300. If the user taps the Delete Button 4712, the selected delivery will be deleted. By tapping a specific delivery line on the screen or selecting the delivery the user wants to see and tapping the Review button 4714, the user is brought to the Delivery Details screen 4800 as shown in Figure 48. The Delivery Details Screen contains five tabs: General 4802, Store Information 4804, Dates 4806, Events 4808 and Cartons 4810.

The General Tab 4802 on the Delivery Details Report 4800 contains information on the status of the delivery 4812, the late status 4814, whether the delivery was preloaded 4816, the company 4818, division 4820, store number 4822, expected cartons to be delivered 4824, the actual number of cartons delivered 4826 and brackets around any exceptions 4828, the number of cartons picked up 4830, damaged 4832 or misrouted 4834, the return BOL number 4836 and transfer BOL number 4838, if any. If the user taps the Reports button 4840, the user is taken to the Cartons tab on the Delivery Details Report 4810. Tapping the Close button returns the user to the Welcome Screen 3300.

The Store Information Tab 4900 on the Delivery Details Report, as shown in Figure 49, includes information concerning the store which can be preloaded into the scanner to assist the driver in making deliveries. The information that can be preloaded into the scanner and displayed in this report is the store location or address 4902, the door number 4904, the level number 4906, the dock number 4908, whether there are height restrictions 4910, whether tolls must be paid in order to get to the store 4912, an action message notice 4914, an action message display box 4916 which if selected shows the action message, the stop number 4917, and directions to the store 4918. By tapping the Reports button 4920, the user is brought to the Cartons tab 4810 on the Delivery Details Report. Tapping the Close Button 4922 takes the user back to the View Deliveries Screen 4700.

The Dates Tab 4806 of the Delivery Details Report, as shown in Figure 50, shows the user the scheduled start time for the delivery 5002, the scheduled end time for the delivery 5004, the actual start 5006 and end time 5008 of the delivery and the elapsed time it took to make the delivery 5010. If the user taps the Reports button 5012, the user is taken to the Cartons tab 4810 on the Delivery Details Report. Tapping the Close Button 5014 takes the user back to the View Deliveries Screen 4700.

The Events Tab, as shown in Figure 51, shows the user when the delivery driver entered and left the store during the delivery process. The columns in the report are C for record number 5102, the Event 5104, Date 5106, and O for Origin 5108. The C record reflects the type of event. The Event column contains either the store open or close scan or check in or check out scans. The Date column gives the date and time for each event. The Origin column lists whether the event data was obtained by scanning the store barcode or manually entered. If the user taps the Reports button 5110, the user is taken to the Cartons tab 4810 on the Delivery Details Report. Tapping the Close Button 5112 takes the user back to the View Deliveries Screen 4700.

The Cartons Tab, as shown in Figure 52, details all cartons scanned at the selected store. The header of the report 5202 lists how many pages of carton detail information are held in the scanner. The columns in this report are the carton number 5204, scan time 5206, damage 5208, origin 5210, pickup or delivery 5212, and carton class 5214. The carton number column contains the entire carton number scanned. The time column contains the time stamp when the carton was scanned. The damage column displays the damage status per carton. The origin column shows whether the carton was entered via a scan or manual entry. The pickup column shows whether the carton was scanned as a delivery into the store ("D") or as a pickup ("P") for cartons that are being taken by the driver for return to the shipper or transfer to another store. The class column shows the type of item scanned: carton, tube, envelope, etc. By selecting a carton, the Carton Details button 5216 becomes activated. Tapping the Carton Details button takes the user to the Carton Details screen 3900. If the user taps the Reports button 5218, the user is taken to the Cartons tab 4810 on the Delivery Details Report. The user can also navigate from the page to page of the report by using the back and forward arrow buttons 5220. Tapping the Close Button 5222 takes the user back to the View Deliveries Screen.

Desktop Application and Web Service

Regardless of the whether the freight tracking and control system is used for the distribution direct or pool distribution model, the data collected by the scanners must be transferred to the SQL database on the web server so that users can use the data to generate reports. The data can be transferred from the scanner to the workstation via a

cradle attached by a serial cable or via a wireless connection.

When the scanner is placed into the cradle or the wireless connection is initiated, the data transfer application is started and BearWare Data Transfer Module screen 3000 is displayed on the PC monitor. This is also referred to as the Client Application 5302 as shown in Figure 53. This screen displays the name of the scanner device 3002, has a meter showing the status of the data transfer 3004, lists the version number of the transfer program 3006, and has a check box 3008 for automatically closing the BearWare Data Transfer application upon completion of the data transfer.

The outbound data packets contain a SOAP envelope and the scanner data in XML format 5304. The data leaves the workstation on which the client application is running via HTTP through port 80. This allows the scan data to be transferred to the web service 5306 without opening any ports on the company's firewall or otherwise compromising the sending or receiving company's internet security. When the SOAP envelope is received by the web server, the web service 5306 parses the scanner data 5308 and inserts it into the SQL database 5310. After the scanner data is successfully inserted into the SQL database, a confirmation from the web service is sent to the client application 5302 and the scan data is automatically deleted from the scanner. In addition to the scan data that is passed via the BearWare Data Transfer Module, the web service can receive and parse tab delimited text files from shippers, such as the ASN.

Once the scan data has been inserted into the web database via the web service, users can navigate to the web based reporting application to query the web database which contains all of the scan data and ASN data.

Web-Based Reporting Tool

The web reporting applications are accessed by a user navigating to it with a standard internet browser application (i.e. Microsoft Internet Explorer 5.xx) and entering the correct web address (i.e. www.weblogisticsinc.com). Depending on the web address entered, the user is brought to the Distribution Center Direct Reports or the Pool Distribution reports.

Distribution Center Direct Reports

After entering in the correct web address in their internet browser application, the user is brought to the login screen as shown in Figure 54. At this screen, the user types in their user name 5402 and password 5404 and then clicks on the login button 5406. The user is then brought to the Welcome Screen as shown in Figure 55. From the Welcome Screen, the user can navigate to the following reports and information: Scan Summary 5502, Pro # Summary 5504, Stem Time Report 5506, Delivery Exceptions 5508, Barcode Tracking 5510, WMS Box Tracking 5512, Pallet Tracking 5514, Bill of Lading 5516, Site Management 5518, User Management 5520, and Help 5522.

The user can obtain a scan summary report by clicking on the scan summary menu option 5502. This will bring the user to the scan summary menu 5600 shown in Figure 56. The user can choose the type of scan data 5602 they wish to view (pick, consolidation, delivery, etc.), enter a plant 5604 or site ID 5606, and enter a date range 5608 to frame their query. The report can also show only no-label items if the no-label box is checked 5610. The report can be returned in Microsoft Excel format if the excel report box 5612 is checked. After entering this query data and the View Report 5614 box is selected, a report 5700 is returned as shown in Figure 57. The header of the report lists the report name 5702 and the date range of the report 5704. The report details the scanner user 5706, the scanner ID 5708, the route 5710, plant 5712, site 5714, barcode 5716, item description 5718, scan time 5720, pallet number 5722, and box number 5724. The barcode 5716, pallet 5722, and box 5724 numbers in the table are all hot linked to other reports. By clicking on the barcode number, the user is brought to the Bar Code Tracking Report shown in Figure 58. By clicking on the Pallet Number, the user is brought to the Pallet Tracking report shown in Figure 59. The WMS Box Tracking Report, shown in Figure 60, is accessed by clicking on the box number in the scan summary report.

The Pro # Summary report is used to track vendor pickups or other freight to which PRO number barcode labels are attached and can be accessed by clicking on this option 5504 from the Report Menu. This brings the user to the PRO # Report Query Screen 6100 shown in Figure 61. Here the user selects the Scanner Mode (Truck/Pickup or Delivery) 6102, and selects a date range using the Start and End Date Calendars 6104. By clicking on the View Report button 6106, the query is run and the Pro # Summary

Report 6200, shown in Figure 62, retrieved. In the header of the report, the report name 6202 and scanner mode 6204 are listed as is the date range 6206 for which the report was run. The columns in this report are the scanner user name 6208, the scanner number 6210, the route number 6212, the plant number 6214, the site 6216, the barcode number 6218, the description of the scanned item 6220, the scan time 6222, the pallet number 6224, the box number 6226 and the tractor number 6228. The barcode number 6218 contains a hotlink to the Bar Code Tracking Report 5800.

The Stem Time Report shows the time elapsed between when a delivery truck left the distribution center to the time a delivery is concluded.. After clicking on this report option 5506 from the Report Menu, the user is brought to the Stem Time Report Query Screen 6300 shown in Figure 63. Here the user selects the plant 6302 and site 6304 from drop down menus and clicks on a date range from the Start Date and End Date calendars 6306. Once this query is run by clicking the View Report button 6308, the Stem Time Report 6400, shown in Figure 64, is returned. The header of the report lists the name of the report 6402 and the date range selected 6404. The report itself contains columns for the BOL number 6406, route number 6408, originating plant number 6410, delivery site 6412, number of items 6414, departure time 6416, arrival time 6418, and time span 6420. The BOL number 6406 contains a hot link that if clicked takes the user to the Bill of Lading for that particular load.

The Delivery Exceptions Report lists all items which were scanned onto a truck at the distribution center, but were not scanned at a delivery site. By clicking on this report option from the Report Menu 5508, the user is taken to the Delivery Exceptions Report Query Screen 6500 shown in Figure 65. To return a delivery exceptions report, the user selects the exception type (shortages, overages, damages, all exceptions) 6502, the plant 6504, the site 6506, and a date range from the Start Date and End Date Calendars 6508 and clicks on the View Report button 6510. The header of the Delivery Exceptions Report 6600 shown in Figure 66 provides the name of the report 6602 and exception type queried 6604 along with the date range selected 6606. The columns in the report are the scanner user 6608, the scan gun number 6610, the route number 6612, the originating plant 6614, the delivery site 6616, the barcode number 6618, a description of the item 6620, the date and time that the item was scanned onto the delivery truck at the

distribution center 6622, the pallet number 6624, the box number 6626, and the tractor number 6628. Numbers in the barcode, pallet and box columns contain hotlinks. Clicking on the barcode number 6618 takes the user to the Barcode Tracking Report 5800. Clicking on the pallet number 6624 takes the user to the Pallet Tracking Report 7200. The WMS Box Tracking Report 7000 is accessed if the Box number 6626 is clicked.

The user can track individual items that have been scanned and obtain a scan history by clicking on the barcode tracking menu option 5510. This will bring the user to the barcode tracking query menu 6700 shown in Figure 67. The user enters a barcode number 6702 on this screen and clicks the view report button 6704. This brings the user to the screen 6800 shown in Figure 68. The header of this report lists the barcode number 6802, the item type 6804, and the destination site 6806. The columns in this report are the scan point 6808, the scan date and time 6810, the scan user 6812 and the scan gun ID 6814. A check mark in the box to the left of the Scan Point column indicates that scan data for that mode has been received.

The user can track individual items that a shipper groups into individual shipments at the shipment, container, box or bill of lading level. This is referred to as "WMS box tracking" (and is also referred to as "trip," "trailer" or "load" tracking) and these reports can be accessed by clicking on the WMS box tracking menu option 5512. This will bring the user to the WMS box tracking query menu 6900 shown in Figure 69. The user enters a WMS box number 6902 on this screen and clicks the view report button 6904. This brings the user to the WMS Box Tracking Report 7000 shown in Figure 70 which details all items that are grouped by a shipper together at the bill of lading or box level. The header of this report lists the box number queried 7002 and the destination site 7004. The columns in the report are the barcode number 7006, the description of the item scanned 7008, the pallet number 7010, box number 7012, the carton number 7014, and whether it was scanned in the consolidation 7016, grid 7018, truck 7020 and delivery scan 7022 modes. Hotlinks are provided for the barcode 7006 and pallet numbers 7010 to the Barcode Tracking Report 5800 and the Pallet Tracking Report 7200.

The user can track individual items that a shipper groups onto pallets or into containers. This is referred to as "pallet tracking" and these reports can be accessed by

clicking on the Pallet tracking menu option 5514. This will bring the user to the pallet tracking query menu 7100 shown in Figure 71. The user enters a pallet number 7102 on this screen and clicks the view report button 7104. This brings the user to the Pallet Tracking Report 7200 screen shown in Figure 72. The header of this report lists the pallet number 7202 and the destination site 7204. The column headings are the barcode numbers of the items scanned onto the pallet 7206, the description of the scanned item 7208, the pallet number 7210, the box number 7212, the carton number 7214, and whether the pallet was scanned in the consolidation 7216, grid 7218, truck 7220 and delivery 7222 scan modes. Hotlinks are provided for the barcode 7206 and box number 7212 to the Barcode Tracking Report 5800 and the WMS Box Tracking Report 7000.

The Bill of Lading menu option 5516 is used to create bills of lading after items are scanned onto a truck at the distribution center. After clicking on the Bill of Lading menu option 5516 from the Reports Menu, the user is brought to the Bill of Lading Query Menu 7300 as shown in Figure 73. Here the user simply selects a date range 7302 and clicks the View BOL's button 7304. The user is then brought to a list of bills of lading which can be printed as shown in Figure 74. The header of this report list the name of the report 7402 and the date range selected 7404. The user can select the bill of lading to be printed by reviewing the BOL number 7406, route 7408, originating plant number 7410, delivery site code 7412, tractor number 7414, date scanned onto the truck 7416, or the received by 7418 information on the report. By clicking on the hotlink BOL number 7406, the user is brought to the bill of lading shown in Figure 75 which can be used by the driver when making the delivery.

The bill of lading contains the name of the carrier 7502, the BOL number 7504, the address of the originating distribution center 7506, the BOL print date 7508, the name and address of the site to which the load is to be delivered 7510, a description of the items loaded on the truck to be delivered by type of item 7512, the barcode number 7514, pallet number (if any) 7516, box number 7518, and carton number 7520. At the bottom of the bill of lading is an area for the consignee to sign for the goods received 7522. Below the list of goods shipped, is an area listing the shipper 7522, the carrier 7524, and boxes to enter the carrier vendor number 7526, prepared by 7528, the shipper's phone number 7530, the driver name 7532, and consignee signature 7534.

The web based reporting system also includes site management tools. The Site Management tool is accessed by clicking on the Site Management Menu option 5518 on the Report Menu 5500. Once this menu option is accessed, the user is brought to the Site Management screen 7600 shown in Figure 76. This tool allows the user to edit delivery sites and their corresponding addresses and other information by selecting one from the pull down menu 7602. The user can then save the changes 7604, delete a site 7606 or add a new one 7608.

The User Management tool is accessed by clicking on the User Management Menu option 5520 on the Report Menu 5500. Once this menu option is accessed, the user is brought to the User Management screen 7700 shown in Figure 77. This tool allows the user to edit users their corresponding user names, passsword and permissions by selecting one from the pull down menu 7702. The user can then save the changes 7704, delete a site 7706 or add a new one 7708.

The Help menu option 5522, if clicked, will take the user to online user documentation which can be either reviewed on line or printed on a local printer.

Pool Distribution Reports

After entering in the correct web address in their internet browser application, the user is brought to the login screen 7800 shown in Figure 78. At this screen, the user types in their user name 7802 and password 7804 and then presses enter or moves their curser and clicks on the sign in button 7806.

After signing in the user is brought to the My webTMS screen 7900 shown in Figure 79. This screen shows summary report information such as a summary of the last ten trips 7902, trips with more than 2% exceptions 7904, and files processed by the web service 7906. The My webTMS screen is customizable by user.

Reports are accessed by the user by selecting the desired report from the pull down reports menu 7907. The available reports found in the pull down reports menu are the ASN/Trip List 7908, Trip Status 7910, Trip Summary 7912, Trip Exceptions 7914, Delivery Exceptions 7916, Scan Summary 7918, Store/Trip List 7920, and Carton Tracking 7922.

By selecting the ASN/Trip List item 7908 from the Reports drop down menu

7907, the user is brought to the ASN/Trip List selection screen 8000 shown in Figure 80. Here the user selects the shipper or pool distributor 8002, and a date range 8004 and then clicks on the Get Data button 8006. This sends a query to the web database to display a list of all inbound shipments to a particular pool distributor or by a particular shipper for a specific period of time. If the user would like the ASN/Trip list returned in Excel spreadsheet format, the user would click on the Excel format button 8008.

Once the query has been retrieved, the ASN/Trip List 8100 is displayed as shown in Figure 81. The header of the report 8102 lists the query parameters: the pool distributor and date range. The ASN/Trip List is made up of the following columns: BOL Date 8104, Trip Number 8106, Pool 8108, Carrier 8110, Trailer Arrival 8112, ASN Total 8114, OS&D Exceptions 8116, Delivery Scans 8118, Proof of Deliveries ("POD's") 8120, and Total 8122. The report also lists the total number of records returned by the query 8124. The BOL Date 8104 is the date that an ASN transmission was sent by a shipper and received by the web database. The Trip Number 8106 is a unique number assigned to a specific aggregation of freight which is loaded on a trailer for a specific pool distributor. The Pool column 8108 contains a four letter unique designation for a specific pool distributor. Carrier 8110 refers to the trucking company bringing the freight from the shipper to the pool distributor. The date and time contained in the Trailer Arrival column 8112 is the date and time the trailer from the shipper was received by the pool distributor. ASN Total 8114 is the total number of pieces of freight that a shipper believes is being sent to a pool distributor for store delivery. OS&D Exceptions 8116 refers to "overs, shorts, and damages." Overs refer to cartons received by the pool which were not in the ASN; cartons which the shipper did not know that it sent to the pool distributor. Shorts refer to cartons that were in the ASN, but were not received by the pool distributor. Damages refer to cartons that were damaged in some way upon receipt at the pool distributor. The number in the OS&D Exceptions column is a total of all overs, shorts and damages for a particular trip. Delivery Scans 8118 refer to the total number of cartons in a particular trip that were scanned at delivery. POD's 8120 refer to the total number of cartons in a particular trip that were verified received by the pool distributor. By selecting the Excel Format box 8126, the user can have the ASN/Trip List downloaded as an Excel spreadsheet.

There are a number of "hot links" on the ASN/Trip List which take the user directly to other reports if selected. By clicking on a date in the BOL Date column 8104, the user is brought to the Trip Status report for that trip. By clicking on a trip number in the Trip # column 8106, the user is brought to the Trip Summary report for that trip. By clicking on the number in the OS&D Exceptions column 8116, the user is brought to the Trip Exceptions report for that trip. By clicking on a number in the Total column 8122, the user is brought to the Scan Summary Report for that trip.

The Trip Status Report can be accessed by selecting the Trip Status Report option 7910 from the Reports Menu 7907. This brings the user to the Trip Status Report query screen 8200 shown in Figure 82. Here the user selects the company from a pull down list 8202 and enters the trip number 8204 and then clicks on the Get Data button 8206. The user is then brought to the Trip Status Report 8300.

The Trip Status Report shown in Figure 83 consists of two parts: Trip Details 8302 and Timestamps 8304. The Trip Details section 8302 gives information on the load as received by the pool distributor. The Timestamps section 8304 lists the date and time of various events relating to a particular trip. The Trip Details section of the Trip Status Report displays the trip number 8306, the shipper 8308, the pool distributor 8310, the carrier who brought the freight from the shipper to the pool distributor 8312, the BOL Date 8314, the District 8316 and Distribution Center (DC) 8318, the load number 8320, the trailer number 8322, the Driver Number 8324 and Name of the driver of the shipment from the shipper to the pool distributor 8326, the percentage of the trailer that was filled with freight ("load percentage") 8328, the seal number 8330, whether the seal was intact on receipt 8332, the seal origin 8334, the load condition 8336, the total number of items in the trailer 8338 and the number of exceptions 8340. The Timestamps section of the report includes the date and time for the departure of the truck from the shipper to go to the pool distributor 8342, the planned arrival of that shipment at the pool distributor 8344, the actual arrival time of the shipment at the pool distributor 8346, the time when unloading of the freight started 8348 and stopped 8350, the time when the first 8354 and last 8356 carton were scanned, and the time when the driver of the truck was released at the completion of unloading the truck 8352.

There are "hotlinks" on the Trip Status Report. By clicking on the Trip Number

8306, the user is brought to the Trip Summary Report for that particular trip. By clicking on the Total Items number 8330, the user is brought to the Scan Summary Report for that particular trip. The Trip Status Report also contains Previous 8358 and Next buttons 8360. By clicking on these buttons, the user is brought to the previous or next trip number.

By selecting the Trip Summary item 7912 from the Reports drop down menu 7907, the user is brought to the Trip Summary selection screen 8400 shown in Figure 84. Here the user selects the company 8402 and selects a trip from a list 8404 of the last one hundred trips in the web database or types in the requested trip 8406 and then clicks on the Get Data button 8408. If the user wants to display the Trip Summary data in an excel spreadsheet form, they click on the Excel Format box 8410. The Trip Status report 8300 for the selected trip can also be accessed by clicking on the Trip Status box 8412 after selecting the company and trip number. This sends a query to the web database to display a store level summary of all cartons shipped on a particular trip.

The Trip Summary Report 8500 shown in Figure 85 displays the queried trip information on the top of the report: the shipper 8502, the pool 8504, the trip number 8506, and the BOL date 8508. The columns on the report are store number 8510, BOL number 8512, ASN total 8514, OS&D Exceptions 8516, Delivery Scans 8518, POD's 8520, and Total Items 8522. The Store Number 8510 is the identification number given by a shipper to a particular store or delivery point. The BOL number 8512 is a number assigned to a particular aggregation of freight that is being delivered to a store on a certain date. The ASN Total 8514 is the number of pieces that the shipper believes sent to that store for the selected trip. The OS&D Exceptions column 8516 contains the number of over, short or damaged cartons for the referenced store and trip number. Delivery Scans 8518 refers to the number of pieces scanned at the store by the driver for the trip. POD's 8520 refers to the number of pieces for which delivery data was entered for a store for the trip. Total Items 8522 refers to the total number of cartons that were available for delivery for that store: the ASN Total less short cartons and plus over cartons. The user can access the Trip Status report 8300 for this trip by clicking on the Trip Status button 8524. The numbers in the Store column are hotlinks. If the user clicks on the store number 8510, the Delivery Summary Report 8600 as shown in Figure 86 for

that trip is displayed.

The header of the Delivery Summary Report lists the shipper 8602, the pool distributor 8604, the trip number 8606, and the delivery date 8608. The columns in this report are the barcode 8610, the carton number 8612, the delivery scan date and time 8614 and the POD date and time 8616. This report shows information on all cartons delivered to a store on a particular date. The barcode number 8612 contains a hotlink to the Carton Tracking Report 9600.

The Trip Exceptions Report is accessed by selecting the Trip Exceptions option 7914 from the Reports pull down menu 7907. This brings the user to the Trip Exceptions selection screen 8700 shown in Figure 87. Here the user selects the company 8702 and the trip number from a list 8704 of the last one hundred trips. To get the Trip Exceptions Report the user clicks on the Get Data Button 8706. The user can also navigate to delivery exceptions and the trip status reports 8300 by clicking on delivery exception 8708 and trip status 8710 buttons.

The Trip Exceptions report 8800 shown in Figure 88 lists all discrepancies found between what the shipper thought was shipped in good condition and what the pool distributor inbound scanned. In the header of the report is listed the shipper name 8802, the pool name 8804, the trip number 8806 and the BOL date 8808. The columns of the report are Store Number 8810, Barcode Number 8812, Status 8814, Reason 8816, Resolution 8818, Damage 8820, and Repair 8822. The store number column 8810 contains the shipper's store number for which a particular carton with exceptions was to be delivered. The barcode number column 8812 contains the barcode number of the particular carton which was an exception. The Status column 8814 lists the exception status of the carton: match, shortage, overage, out of area, or duplicate. The Reason column 8816 lists the reason the carton was an exception. The Resolution column 8818 details how the pool distributor dealt with the exception carton. The Damage column 8820 lists the type of damage associated with the carton. The Repair 8822 column details how the pool distributor dealt with the damaged carton. At the bottom of the report exceptions, damages, and total trip exceptions are totaled 8824. The user is also able to navigate to the trip status 8826 and delivery exceptions 8828 reports for the trip shown in the header 8806 from this screen. Hotlinks are provided in this report from the store

number 8810 and barcode number 8812. The store number 8810 if clicked takes the user to the Delivery Summary Report 8600 and the barcode number 8812 to the Carton Tracking Report 9600.

The Delivery Exceptions Report lists all cartons which were expected to be delivered to a store, but were not. The Delivery Exceptions Report is accessed by selecting the report 7916 from the Reports drop down menu 7907. After this selection is made the user is brought to the Delivery Exceptions Query Screen 8900 shown in Figure 89. At this screen the user selects the company 8902, the trip 8904, and the exception mode (ASN v. Delivery/POD; Inbound v. Outbound; Inbound v. Delivery/POD) 8906 and then clicks on the Get Data Button 8908. The user is then brought to the Delivery Exception Report 9000 shown in Figure 90. In the header of the report are listed the shipper 9002, the pool 9004, the trip number 9006 and the BOL Date 9008. The columns in the report are the store number 9010, the barcode number 9012, the status 9014, the ASN Timestamp 9016, and Delivery Timestamp 9018. Hotlinks on this report are the store number 9010 which takes the user to the Delivery Summary Report 8600 and the barcode number 9012 which takes the user to the Carton Tracking Report 9600.

The Scan Summary Report is accessed by selecting the report 7918 from the Reports drop down menu 7907. This report lists all cartons scanned in all modes for a particular trip. After selecting the Scan Summary Report menu option, the user is brought to the Scan Summary Query Screen 9100 shown in Figure 91. Here the user selects the company 9102, and either enters a trip number 9106 or selects a trip number from the pull down list 9104. After clicking on the Get Data Button 9108, the user is brought to the Scan Summary Report 9200 shown in Figure 92. In the header of the report are listed the shipper 9202, the pool 9204, the trip number 9206 and the BOL Date 9208. The columns in this report are the store number 9210, the barcode number 9212, ASN 9214, Inbound 9216, Outbound 9218, Delivery 9220, and POD 9222. The date and time in the ASN, Inbound, Outbound, Delivery and POD columns reflect the time when the listed carton passed through that scan point. Hotlinks on this report are the store number 9210 which takes the user to the Delivery Summary Report 8600 and the barcode number 9212 which takes the user to the Carton Tracking Report 9600.

The Store/Trip List provides the user with a historical summary of deliveries

made to a particular store over a given time frame. The Store/Trip List Report is accessed by selecting the report 7920 from the Reports drop down menu 7907. The user is then brought to the Store/Trip List Query Screen 9300 shown in Figure 93 where they select the company 9302 and the store number 9304 and click on the Get Data button 9306. This takes the user to the Store/Trip List 9400 shown in Figure 94. Here the user sees a historical summary of deliveries to the selected store. The columns in this report are BOL Date 9402, Trip Number 9404, Driver Name 9406, Signee 9408, Delivery Start 9410, Delivery End 9412, Time 9414, and Total 9416. The BOL Date 9402 is the date on which the ASN was received on the web database; the Trip Number 9404 is the number associated with a particular load of freight from the shipper; the Driver Name 9406 is the name of the driver who delivered the shipper's freight to the store; the signee name 9408 is the name of the store personnel who signed for the delivery; the Delivery Start 9410 and End 9412 are the timestamps entered by the driver into the scanner prior to and at the end of making the delivery; time 9414 refers to elapsed time between the delivery start and end; total 9416 is the total number of cartons delivered to the store.

The report contains hotlinks as well. By clicking on the BOL Date 9402 or Total 9416 the user is brought to the Delivery Summary Report 8600. This report lists all cartons delivered to a particular store for a particular trip. The header of the report lists the shipper 8602, the pool 8604, the trip number 8606, and the delivery date 8608. In the body of the report are listed the barcode 8610, the carton number 8612 and the delivery scan date and time 8614, the POD time stamp 8616, damages 8618, and any repair to a damaged carton 8620. By clicking on the Trip Number in the Store/Trip List 9404, the user is brought to the Trip Summary Report 8500.

The Carton Tracking Report is used to display summary information on a particular carton. From the Reports pull down menu 7907, the user selects Carton Tracking 7922 to get to the Carton Tracking Query Screen 9500 shown in Figure 95. Here the user selects the company 9502, enters a carton number 9504 or the complete barcode number 9506 and clicks on the Get Data Button 9508. From there, the user is brought to the Carton Tracking Report 9600 shown in Figure 96. This Report contains three parts: the Trip Information 9602, Item Details 9604, and Scanning History 9606. The Trip Information 9602 portion of the report lists the shipper 9608, the pool 9610, the

trip number 9612 and the store 9614 where the carton was to be delivered. The Item Details 9604 section of the report lists the barcode number 9616, the carton number 9618, a UPS Tracking Number 9620, the status 9622, the reason 9624, resolution 9626, damage 9628, repair 9630, carton weight 9632, carton cube 9634and carton units 9636. The Scanning History 9606 section of the report sets forth the scanning mode 9638, the origin of the data (scanned or manual) 9640, the scan date and time 9642, the scan user 9644 and the scan gun number 9646 for each scan point.

The pool distribution web-based reports also have an administration component. The administration tools are accessed from the Administration drop down menu 9700 shown in Figure 97. The two administration options are import summary 9702, and user management 9704.

The Import Summary Report lists all files transmitted by particular shippers and pool distributors to the web service for a selected day. This report is accessed by clicking on the Import Summary Menu option 9702. Clicking on this menu option takes the user to the Import Summary Query Screen 9800 shown in Figure 98. Here the user enters the date for which they want an import summary 9802 and click on the Get Data button 9804. The user is then taken to the import summary report 9900 shown in Figure 99. The import summary report breaks down the files received by Retailer (Shipper) 9902 and Pool 9904. The columns in the report are Sender 9906, ASN 9908, Inbound 9910, Outbound 9912, Delivery 9914, POD 9916, Stores 9918, and Total 9920. By scrolling down the page 9922, the user views more detailed information on the files imported. A sample of this portion of the report is shown in Figure 100. Here the file name is shown 10002, the shipper for whom the file pertains 10004, the pool distributor who sent the file 10006, the type of file 10008, and information on the addition of the file to the database 10010.

The About Menu option shown in Figure 101 contains three options: Contact BearWare 10102which opens the user's email application and fills in the addressee box to bearware@bearwareinc.com, BearWare Website 10104 which takes the user to BearWare's website, www.bearwareinc.com, and Help 10106 which takes the user to online documentation on the use of the web application.

Although the preferred embodiment has been described in detail, it should be

understood that various changes, substitutions, and alterations can be made therein without departing from the spirit and scope of the invention. It will be appreciated that various changes in the details, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the area within the principle and scope of the invention.